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Raw Material Resources of Latin America

BY HOWARD J. TRUEBLOOD

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Raw Material Resources of Latin America

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IN a period when imperialism has entered a new phase with the expansion of the Rome-Berlin-Tokyo bloc, and free trade in the world's essential commodities has been throttled by restrictive measures and autarchic policies, industrial nations look at Latin America with renewed interest. As in the colonial era, Latin America's attraction lies more in what it can produce than in what it can buy. The two problems are, of course, closely linked in an economic sense, and the race to sell more automobiles, textiles, sewing machines and other manufactured goods to Latin America has not been forgotten. Yet, with purely commercial considerations subordinate to political or military requirements throughout a large section of the world, the struggle of the "have nots" for raw materials and of the "haves" to maintain and strengthen existing sources of supply has tended to overshadow efforts to sell goods manufactured from these raw materials.

The heterogeneous group of twenty republics and various European possessions located below the Rio Grande, generally described as Latin America, has an area of approximately 8,134,000 square miles and an estimated population of 127,540,000.[1] While the number of inhabitants corresponds roughly to that of continental United States, the area of the latter is somewhat less than 37 per cent that of Latin America. In other words, this group of countries extends over almost 16 per cent of the world's area but contains only 6 per cent of the total population. South America has a population density of about 12.5 per square mile, as compared with the world average of over 41 and the United States average of about 43.5, while the figure for Central America and the Caribbean area is approximately 36.2.[2]

1. League of Nations, *Statistical Yearbook, 1937-1938*. Area and population figures, both on Latin America as a whole and on various individual countries, are subject to wide variation. Such data, revised annually, may also be found in the U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, *Foreign Commerce Yearbook*.

PRESENT ECONOMIC BASES

The importance of the Latin American countries in the world economy lies primarily in their capacity, partly developed and partly potential, to produce vast quantities of foodstuffs and industrial raw materials. There has been a tendency since early colonial days to overestimate the immediate sources of wealth in Latin America, but the fact remains that this area—aside from various minor imperialistic claims already staked out—represents the richest raw material producing section of the world not under direct domination of one or more great powers. Its importance in this sense, moreover, lies not so much in the volume of primary production as in the exportable surplus. For example, while Latin American wheat production in 1937 was less than 7 per cent of the world total (excluding the U.S.S.R.), its exports accounted for almost 35 per cent of world trade in this commodity.[3] In 1937 the estimated value of total Latin American primary production was $4,829,900,000 (old U.S. gold dollars), representing approximately 7.9 per cent of the world total, which was almost identical with the pre-depression ratio (1925-1929 average).[4]

Latin American exports in 1937, consisting almost entirely of industrial raw materials and foodstuffs, were valued at $1,583,000,000 (gold), as compared with a world total of $15,369,000,000.[5] Since exports of manufactured goods were negligible it is evident that Latin America sold abroad almost one-third of its primary production (value basis). Its exports, moreover, were valued at more

2. Despite the low average in Latin America, Cuba, the Dominican Republic, El Salvador, Guatemala, Haiti and the British, French and Netherlands West Indies all have a population density higher than that of the United States.

3. Computed from *Statistical Yearbook, 1937-1938*, cited, and League of Nations, *International Trade in Certain Raw Materials and Foodstuffs, 1937*.

4. League of Nations, *World Production and Prices, 1937-1938*, p. 107.

5. League of Nations, *Review of World Trade, 1937*.

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than 10 per cent of the world total, despite the fact that the latter included a high percentage of manufactured goods. Latin America's importance in world export markets is further enhanced by the fact that this area has a monopoly, or near monopoly, in the production of various key materials. Outstanding among the latter is coffee, Latin American production of which accounted for 88 per cent of the world supply in 1937.[6] Bananas, natural nitrates, sisal and other products of a minor nature might also be included in this category. From the point of view of exports rather than production, Latin America is the dominant factor in the supply of several major commodities.[7]

TABLE I

PRODUCTION AND EXPORTS OF PRINCIPAL LATIN AMERICAN RAW MATERIALS IN 1937[1]

(*Thousands of Metric Tons*)

	PRODUCTION		EXPORTS		PRINCIPAL MARKETS
Commodity	*Volume*	*Per cent of World*	*Volume*	*Per cent of World*	*Per cent of exports*
Cacao	228.0	31.0	183.9	27.8	U.S.A. 70.6; Germany 14.8
Cattle hides	.....	.....	253.5	42.1	Germany 34.8; U.S.A. 16.9; U.K. 11.9
Coffee	2,186.0	88.1	1,282.9	81.4	U.S.A. 56.7; Germany 14.4; France 9.6
Corn	19,010.0	20.0	9,970.0	73.6	U.K. 32.8; U.S.A. 20.7; Germany 16.6
Copper[2]	512.8	21.4	414.9	25.9	U.S.A. 37.4; U.K. 29.7; France 9.1; Germany 8.7
Cotton	727.0	8.8	318.6	9.5	U.K. 34.9; Germany 34.8
Nitrates	.....	7.9	1,443.7	61.6	U.S.A. 41.0; Egypt 16.0; Germany 8.1
Petroleum	44,619.0	14.9	.....	.....	.....
Sugar	7,150.0	25.6	4,087.4	48.4	U.S.A. 49.4; U.K. 29.6
Tin Ore	27.4	13.2	25.0[3]	.....	.....[3]
Wheat	7,061.0	6.8	4,067.0	28.9	Italy 19.7; U.K. 19.7; Germany 13.5
Wool	277.0[4]	15.9	185.5	16.1	U.K. 46.6; Germany 33.3; U.S.A. 32.1; France 25.8
Silver	116.0[5]	42.7	.....	.....	.....
Gold	2,389.5[6]	7.2	.....	.....	.....

1. Compiled from League of Nations, *International Trade in Certain Raw Materials and Foodstuffs, 1937*, cited, and *Statistical Yearbook, 1937-1938*, cited; Bureau of Foreign and Domestic Commerce, *Foreign Commerce Yearbook, 1938*, cited; Bureau of Mines, *Minerals Yearbook, 1938*, cited; "Economic and Financial Developments in Latin America in 1937," *Commercial Pan America*, Nos. 70-72 (Washington, Pan American Union, 1938); *Bolivia* (New York), Vol. VII, No. 3, 1939.

2. A large part of the copper imported by the United States from Latin America is refined for re-export.

3. Bolivian exports only. Almost all Bolivian tin ore (93 per cent in 1934-1937) is shipped to Great Britain for refining. Under the circumstances, it is impossible to ascertain its ultimate destination.

4. Production data for 1936.

5. Millions of ounces.

6. Thousands of ounces.

International demand and prices for these products play a dominant part in the internal business conditions and purchasing power of these countries. Several Latin American states, notably Brazil and Colombia, have diversified their exports and thus partially eliminated the danger of dependence on one or two crops of raw materials. This trend has been accompanied by expansion of agricultural and industrial production for domestic consumption, but internal purchasing power remains highly dependent on external factors. As previously pointed out, the value of primary Latin American production in 1937 was about $4,829,900,000 (gold), and secondary, or manufacturing, production was possibly 40 per cent of this figure. Since at least 50 per cent of the value of secondary production probably represented values already included in primary production, the total may be estimated at roughly $5,800,000,000. On this basis, Latin American exports were equal to about 27 per cent of aggregate production.[8] It should be noted, however, that in some instances the trend of total exports is not a reliable guide to internal economic conditions owing to foreign ownership of the products, or concentration of production in relatively few hands.

6. *Statistical Yearbook, 1937-1938*, cited.

7. Cf. Table I. The virtual monopoly which Latin America formerly held in rubber production has shifted to other producers, and cotton, despite recent increases in production, is of far less importance today than in the nineteenth century.

8. In 1933 it was calculated that about 40 per cent of Argentine production was exported, but the rapid industrialization in recent years and the decline in foreign trade compared with the pre-depression period are believed to have reduced the ratio to about 20 per cent. Cf. Keech Ludwig, "Trends and Effects of Argentine Industrialization," *Commercial Pan America* (Pan American Union, Washington, D.C.), August 1937.

In the case of Bolivia, tin accounts for about two-thirds of its exports, but the industry affects a comparatively small section of the population.[9] Only 0.8 per cent of Chile's population is employed in the nitrate and copper industries, which account for about 75 per cent of the country's annual exports.[10] To cite a somewhat different example, the full proceeds of Colombian petroleum exports do not return to that country, since the industry is owned and operated by foreign capital, and the Colombian authorities take this factor into consideration in dealing with foreign trade statistics. As a matter of fact, they assert that no part of the value of petroleum exports, and only 70 per cent of banana and 40 per cent of platinum exports, remain in Colombia.[11]

An analysis of the industrialization of Latin America, to which an increasing amount of attention has been given since export markets began to dwindle in 1930, is beyond the scope of this survey. As a measure of the progress made before the depression, it has been estimated that the power consumed in Latin America—in terms of coal—was about 16,000,000 tons in 1913, of which coal itself accounted for 87 per cent, petroleum 8 per cent and water power 5 per cent.[12] In 1928 power available for consumption was the equivalent of 27,416,000 tons of coal, made up of 37 per cent coal (of which domestic production accounted for only about 30 per cent), 49 per cent petroleum and 14 per cent water power.[13] Since the population increase over this period is calculated at 41 per cent, per capita power consumption apparently advanced by about 20.5 per cent. Progress has been especially rapid since 1930, although aggregate figures are not available.[14] The Chilean index of industrial production in 1938, for example, averaged 159.6 per cent of the 1927-1929 level, with production of cement and paper showing increases of 206 and 302 per cent over the base period.[15] In Colombia the recorded value of industrial production rose in the three years 1934-1936 from 47,282,000 to 105,634,000 pesos, textile manufacturing having shown the most pronounced expansion.[16] Over a longer period, in the absence of annual data, the value of industrial production in Argentina increased 79.1 per cent from 1914 through 1935,[17] and there is ample evidence that the advance has since been continued. The record is similar in Brazil,[18] while the Mexican index of the value of manufacturing production in 1938 was 54 per cent above the base year (1934).[19]

The foregoing examples illustrate trends in progress throughout Latin America, and there is no indication that the present tendency to expand domestic production of simple manufactures will not continue. There is little doubt that Latin America is approaching self-sufficiency in many products almost entirely imported in former years. In this sense it is undergoing the normal development toward economic maturity. The industrialization process has been stimulated by the drive for self-sufficiency in Europe, the Empire preferences instituted by Great Britain, the drop in demand for industrial raw materials and the cessation of new foreign credits, all of which have limited Latin America's capacity to import.[20] It should not be assumed, however, that Latin America as a whole is becoming "industrialized" in the manner of the United States, or even that the basis for such industrialization exists. The degree of industrialization may be measured roughly by the daily per capita output of horsepower hours, which, in Chile, has been calculated at 1.90, and of this 18 per cent was contributed by human labor.[21] This may be compared with a daily per capita output of 13.38 horsepower hours in the United States, of which less than 2.5

9. In 1938 there were about 25,000 workers employed in the tin mining industry in Bolivia, as compared with a total population of about 3,171,000.

10. Employment in the copper and nitrate industries averaged 39,541 in 1938, as compared with a population of 4,634,939 (December 31, 1938). *Dirección General de Estadística, Estadística Chilena,* December 1938.

11. In 1938 this meant the reduction in exports from a gross figure of 163,226,000 pesos to 122,365,000 pesos. *Revista del Banco de la República,* April 1939. While there is considerable justification in assuming that a large part of the proceeds of petroleum exports remains abroad, the deduction of all petroleum exports would be correct only in the extremely improbable event that the oil companies covered costs of production out of the proceeds of local sales.

12. J. R. Bradley, "Fuel and Power in Latin America," U.S. Department of Commerce, *Trade Promotion Series No. 126.* 1931, p. 2.

13. *Ibid.,* p. 3.

14. Cf. Howard J. Trueblood, "Trade Rivalries in Latin America," *Foreign Policy Reports,* September 15, 1937, pp. 155-56.

15. Banco Central de Chile, *Boletín Mensual,* February 1939, p. 42.

16. A. Murray Simpson, *Report on Economic and Commercial Conditions in the Republic of Colombia* (London, H.M. Stationery Office, 1939), p. 23.

17. República Argentina, Ministerio de Hacienda, Comisión Nacional del Censo Industrial, *Censo Industrial de 1935* (Buenos Aires, 1938), p. 35.

18. Cf., for example, "The Progress of Manufacturing in Brazil," *Commercial Pan America,* No. 55, December 1936.

19. Departamento Autónomo de Prensa y Publicidad, *Revista de Estadística,* April 1939, p. 10.

20. For a general discussion of these trends in South America, cf. Royal Institute of International Affairs, *The Republics of South America* (London, Oxford University Press, 1937), pp. 185-87.

21. Cf. H. F. Bain and T. T. Read, *Ores and Industry in South America* (New York, Harper, 1934), p. 9. In Argentina the daily per capita output of work was estimated at 1.69 horsepower hours, followed by Peru and Brazil with 0.66 and 0.63, respectively.

per cent represents human labor.[22] For the present, at least, Latin America has not the combination of large population in juxtaposition to accessible and high-grade coal and iron ore reserves which appears to be necessary for the development of heavy industries. Light manufactures, however, involving fewer marketing and distribution problems, may be expected to gain in importance.

PRODUCTION AND TRADE

Table I illustrates the importance of Latin America as a source of supply for various key raw materials. The list is incomplete, but the addition of a few industrial raw materials and foodstuffs would complete the roster of commodities on which the international position, as well as the internal purchasing power, of Latin America depends. Among the more important commodities not included are bananas—which are produced largely in the Caribbean countries, by American capital, for the United States market. In 1936 Latin America accounted for 81.3 per cent of total world exports of bananas, and about two-thirds of Latin American shipments were absorbed by the United States.[23] Latin America is also the predominant factor in the international meat trade, with production for the world market concentrated in Argentina and, to a much lesser extent, in Brazil. In 1937 Argentina exported chilled, frozen and preserved meats valued at 312,225,000 pesos (about $94,000,000), of which 80.7 per cent was destined for the British market.[24] Argentina also contributes the bulk of Latin American linseed production, which in 1936 made up about 79 per cent of world trade in this commodity.[25] Among other commodities exported in quantity by Latin America but of considerably less importance than the raw materials and foodstuffs tabulated or mentioned, are bauxite, iron ore, lead, manganese, quebracho, sisal and zinc.

The direction of Latin American export trade is hardly less important than its composition. The total export trade of the twenty independent republics of this area was valued at $2,396,054,000 in

22. *Ibid.*

23. Cf. International Institute of Agriculture, *International Yearbook of Agricultural Statistics, 1937-1938* (Rome, 1938), pp. 94-96.

24. Cf. U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, *Commerce Reports*, March 4, 1939, p. 214. The British share in this trade has decreased from 90.3 per cent in 1935, although the United Kingdom still absorbs virtually the entire Argentine output of chilled beef and frozen mutton. Germany took 5.1 per cent of Argentine meat exports in 1937, against 1.3 per cent in 1935, and there have been indications that German imports would be expanded under barter arrangements. *New York Times*, March 15, 16 and 29, 1939.

25. *International Yearbook of Agricultural Statistics, 1937-1938*, cited pp. 595-97.

TABLE II

COMMODITIES EXPORTED BY PRINCIPAL LATIN AMERICAN COUNTRIES*

(Per cent of total export values)

Country	*1929*	*1932*	*1937*	*1938*
Argentina				
Cereals and linseed	62.4	61.9	63.9	42.1
Meat	12.8	13.3	13.5	22.6
Wool	7.3	5.9	7.4	11.0
Total	82.5	81.1	84.8	75.7
Brazil				
Coffee	71.0	71.6	42.4	45.1
Cotton	4.0	0.1	20.4	18.2
Total	75.0	71.7	62.8	63.3
Chile				
Copper	53.4	38.7	53.2	48.2
Nitrates and iodine	38.5	19.8	20.0	22.2
Total	91.9	58.7	73.2	70.4
Colombia				
Coffee	60.6	60.9	53.8	54.4
Petroleum	21.3	23.4	19.0	22.7
Bananas	7.0	8.5	3.8	5.4
Total	88.9	92.8	76.6	82.5
Cuba				
Sugar	73.7	71.2	78.7	82.0†
Mexico				
Petroleum and products	13.1	23.7	18.2	9.3
Copper	15.0	4.5	5.9	4.5
Lead	14.3	7.0	13.5	11.9
Zinc	10.3	3.3	9.6	9.2
Gold	.....	11.0	14.4	19.8
Silver	15.8	11.5	14.3	21.0
Total	68.5	60.6	75.9	75.7**
Peru				
Petroleum and products	38.5	43.2	33.0	29.5
Copper bars	19.8	7.7	13.9	16.9
Cotton	15.4	19.0	24.3	17.7
Sugar	10.1	14.5	8.7	7.3
Total	83.8	84.4	79.9	71.4
Venezuela				
Petroleum and products	76.1	84.5	90.5	.....
Coffee	17.2	9.3	4.5	.....
Total	93.3	93.8	95.0	.....

*Compiled from U.S. Department of Commerce, *Commerce Yearbook*, Vol. II, 1931 and 1932, and *Foreign Commerce Yearbook, 1938*, cited; League of Nations, *International Trade Statistics*, 1931, 1932, and 1937, cited; and various Latin American sources.

†Estimated.

**First 10 months.

1937, of which the United States accounted for 31 per cent, the United Kingdom 17.7 per cent, Germany 8.7 per cent, France 4 per cent and Italy 3.1 per cent.[26] Among the more important commodities listed in Tables I and II, the United States in 1937 provided the chief market for Latin American cacao, coffee, nitrates and sugar; the United Kingdom led in the consumption of corn, cotton, wool and, under normal circumstances, wheat, while Germany ranked first in the consumption of cattle hides.[27] The United Kingdom also probably leads in the consumption of Latin American copper, since a large part of United States imports is refined in this country and re-exported. It is impossible to determine the ultimate destination of Bolivian tin, most of which is sent to the United Kingdom for refining, while the complexities of the petroleum industry permit only a rough estimate as to consuming markets. In 1937, because of the drought, the United States was placed in the unusual position of importing over 20 per cent of Latin American corn exports; Italy ranked with the United Kingdom as a market for wheat, due largely to a domestic shortage which necessitated extraordinary purchases in Argentina.[28]

RESOURCES AND POTENTIALITIES

In considering the raw material resources of Latin America, less stress need be laid on the agricultural products already being produced in volume for export than on other potentialities in the agricultural or mineral groups. For example, while it is unnecessary to calculate Brazil's maximum possible production of coffee when the country is ready to supply almost any conceivable increase in demand, there is ample reason to inquire into Brazil's cotton, iron, manganese or rubber potentialities. In a similar manner, Argentina may be prepared to meet a larger share of the world's grain and meat requirements, and Chile those for copper and nitrates, but it is open to question whether those traditional sources of wealth will continue to form the basis of the two nations' economies. The following description of the chief raw material resources of Latin America is, therefore, largely concerned with unexploited mineral resources and production potentialities.

Antimony. Latin American production of antimony in 1937 was estimated at 14,570 metric tons, or approximately 42 per cent of the world total of 34,500 tons. Mexico was the principal producer, with an output of 9,788 tons, followed by Bolivia and Peru with 3,934 tons and 848 tons, respectively. Latin American producers supply all but a small fraction of United States imports of antimony.[29]

Bauxite. Although bauxite, from which aluminum is made, is not of great importance as a source of wealth to Latin America,[30] the latter produced in 1937 approximately 697,329 metric tons, or about 20 per cent of estimated world production (3,500,000 tons).[31] Production is concentrated in Surinam (Dutch Guiana) and British Guiana, which produced 392,329 and 300,000 tons, respectively. Surinam production is almost entirely in the hands of the Surinaamsche Bauxite Mattschappii, a subsidiary of the Aluminum Company of America.[32] Bauxite production in British Guiana is also in American hands, through the operations of a local subsidiary of Aluminium, Limited, a Canadian corporation controlled by United States capital, although a British company was reported to have obtained a lease on a deposit in 1929.[33] The Guiana product is reputed to be as high in quality as the bauxite produced elsewhere, and deposits are apparently both extensive and accessible. It is improbable, however, that the present system of shipping calcined ore abroad will be abandoned in favor of the establishment of a local aluminum industry.[34]

Not only is the production of Guiana bauxite almost wholly controlled by American capital, and the entire Surinam output taken by the United States, but in 1937 about 27 per cent of British Guiana bauxite exports was shipped to this country, while 53 per cent went to Canada.[35] In the same year, Surinam furnished 79 per cent of United States imports of bauxite and British Guiana 16 per cent,[36] while it is estimated that two-thirds of the domestic production of aluminum

26. Julian G. Zier, "Latin American Foreign Trade," *Bulletin of the Pan American Union,* April 1939, p. 233. These figures do not include exports of the various British, French, Dutch and American dependencies. Total Latin American export trade in 1937 is estimated at $1,583,000,000 (gold), or approximately $2,680,000,000. *Review of World Trade, 1937,* cited.

27. The use of a single year in Table I has resulted in a certain amount of distortion, but 1937 was on the whole a "normal" period and reflects recent trends somewhat better than an average of several years.

28. Cf. U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, *Economic Review of Foreign Countries, 1937,* p. 163.

29. All data from U.S. Department of Interior, Bureau of Mines, *Minerals Yearbook, 1938* (Washington, Government Printing Office), pp. 649-52.

30. Latin American bauxite production in 1937 was valued at about $4,000,000, based on average prices in the United States.

31. G. A. Roush (ed.), *The Mineral Industry during 1937* (New York, McGraw-Hill, 1938), p. 47.

32. Cf. Standard Statistics Corporation, Inc. (New York), *Standard Corporation Records,* Vol. A-B, p. 7790 (1939).

33. Bain and Read, *Ores and Industry in South America,* cited, pp. 91-92.

34. *Ibid.,* p. 93.

35. Roush, *The Mineral Industry during 1937,* cited, pp. 49-50.

36. *Ibid.*

in 1937 was from Guiana bauxite.[37] Such imports, however, are ascribed to the high grade and cheapness of the Guiana product, rather than to the lack of domestic reserves.[38] Brazil contains 81 known deposits of bauxite, but only one is being worked by a Brazilian-owned company, which entered into a contract in 1936 to supply Argentina with a total of 50,000 tons.[39] Total Brazilian reserves have been estimated at 33,400,000 tons, and exports, which are believed to have accounted for 80 per cent of production during the last three years, were 12,928 tons in 1938, 8,770 tons in 1937 and 7,000 tons in 1936.[40]

Chromium. The value of exports of chromium ore from Cuba, the only important producer at present in Latin America, was $482,957 in 1937,[41] and, allowing for a modest contribution from Brazil, the total value of production of this commodity probably did not exceed half a million dollars. Yet its virtual indispensability to the modern peace-time steel industry and its high strategic value in case of war warrant its inclusion among the important resources of Latin America. In 1937 Cuban exports of chromium ore, almost all of which were destined for the United States, amounted to 96,590 metric tons,[42] as compared with estimated world production of 1,350,000 metric tons[43] and total United States imports of 553,916 tons.[44] Brazilian exports for the same year have not been reported, but since they amounted to 3,890 tons in 1936—all of which went to Italy—it is possible that this total was equalled in 1937.[45] Cuban reserves are large and capable of output for many years, but the product is low grade, suitable only for refractory purposes and not for the steel industry.[46] It is possible, however, that Cuban ore could be refined for metallurgical purposes, if necessary.[47] On the other hand, while Brazilian deposits are not being exploited on the same scale as the Cuban, owing primarily to transportation difficulties, the ore is relatively rich, and reserves of the most important deposit have been estimated at 4,000,000 tons.[48] Occurrence of chromium has also been reported in Colombia, Costa Rica and Nicaragua, although, aside from Cuba, Brazil offers the greatest potentialities.

Coal. The comparative lack of coal is one of the more significant features of the Latin American economic structure. In 1937 it is estimated that Latin American production amounted to only 3,806,000 tons, in contrast with total world output of approximately 1,515,000,000 tons.[49] During the same year, exports of coal from the United States, the United Kingdom and Germany to the principal Latin American markets totaled about 7,200,000 tons, which would indicate that not more than a third of this area's extremely modest coal requirements was supplied by domestic production.[50] Of the three principal Latin American coal producing countries, moreover, only Chile, which normally accounts for about 50 per cent of the total output, is self-sufficient. In the case of Chile, relatively accessible deposits and a high tariff on coal imports have resulted in virtually exclusive use of the domestic product, despite its low quality, although a substantial amount of foreign fuel oil is used in preference to coal.[51] Mexico ranks second in Latin American coal production and, due to abundant petroleum resources, is also practically self-sufficient.[52] The only other important producer in Latin America — Brazil — mined 763,000 tons of low-grade coal in 1937 and imported 1,516,000 tons, chiefly from Germany and Britain.[53] Brazilian coal is low in calorific value and high in ash content, but its use has been fostered by legislation

37. Seventy-sixth Congress, House of Representatives, *Hearings before the Committee on Military Affairs,* on H.R. 2969, 3320, 2556, 2643, 1987, 987 and 4373 (Strategic and Critical Raw Materials), p. 219.

38. Brooks Emeny, *The Strategy of Raw Materials* (New York, Macmillan, 1934), p. 29.

39. U.S. Department of Interior, Bureau of Mines, *Mineral Trade Notes,* May 20, 1939. About half of the contract total was reported to have been shipped by the end of 1938. Negotiations with a German firm were said to have been undertaken without success.

40. *Ibid.,* While it is not believed that Brazil can compete as yet in the international bauxite market, owing to high freight rates and lack of transportation equipment which offset low extraction costs, the establishment of a domestic aluminum industry is a possibility.

41. Editora Mercantil Cubana, S.A., *Cuba Económica y Financiera,* April 1939, p. 58.

42. *Ibid.*

43. Roush, *The Mineral Industry during 1937,* cited, p. 88.

44. Long tons. *Minerals Yearbook, 1938,* cited, p. 544.

45. Roush, *The Mineral Industry during 1937,* cited, pp. 90-91.

46. Cf. *Hearings before the Committee on Military Affairs,* cited, p. 220.

47. Emeny, *The Strategy of Raw Materials,* cited, p. 68.

48. Roush, *The Mineral Industry during 1937,* cited, p. 91. Of the three chief mines, two are said to be owned by Brazilians and the other by American interests.

49. *Minerals Yearbook, 1938,* cited, pp. 724-26. Mexican production, included in the Latin American total, from *Revista de Estadística,* December 1938, p. 19.

50. The per capita consumption of coal in Latin America is about one-tenth ton annually, as compared with some 33 tons (bituminous only) in the United States during 1937. In 1928 Latin American coal consumption was placed at 10,269,000 tons, of which 30 per cent represented domestic production. Bradley, "Fuel and Power in Latin America," cited, p. 2.

51. Bain and Read, *Ores and Industry in South America,* cited, pp. 251-57.

52. Cf. Bradley, "Fuel and Power in Latin America," cited, pp. 118-19. Reflecting the displacement of coal by oil fuel, consumption of the former in Mexico was placed at only about a third that of pre-war years.

53. American Chamber of Commerce for Brazil, *Brazilian Business,* October 1938, p. 492.

which forces importers of foreign coal to purchase a fixed proportion (now 20 per cent) of the Brazilian product.[54]

Colombia, although a small factor in coal production, is reputed to have reserves of 27,000,000,000 metric tons, while Argentina, whose coal requirements are greatest among the Latin American nations, is believed to have reserves of only about 5,000,000 tons.[55] The total coal resources of Chile are in the neighborhood of 3,000,000,000 tons, and those of Brazil are undoubtedly substantial, if low in quality.

Copper. In terms of export trade, copper is one of the major economic resources of Latin America, and this area accounts for over a fifth of total world production of the metal. Of the five active producing countries—Bolivia, Chile, Cuba, Mexico and Peru—Chile is by far the most important, with production accounting for about 79 per cent of the Latin American total and over 17.5 per cent of the world total in 1938. Under the stimulus of higher prices and world industrial recovery, Latin American copper production reached the record level of 511,562 metric tons in 1937 and, although output receded to 445,412 tons in 1938, the latter figure compared favorably with 1929 production of 471,199 tons. As a matter of fact, Chilean output last year was about 10 per cent above the 1929 level, which tended partially to offset a sharp drop in other producing areas.

LATIN AMERICAN COPPER PRODUCTION*
(*Metric tons*)

Country	*1929*	*1933*	*1938*
Bolivia	6,985	1,905	2,883
Chile	316,813	163,395	351,370
Cuba	14,279	7,354	13,427
Mexico	78,708	39,683	41,425
Peru	54,414	24,874	36,307
Total	471,199	237,211	445,412
Per cent of world	24.5	22.8	22.4

**Year Book of the American Bureau of Metal Statistics,* 1935 and 1938 (New York).

The Latin American copper industry is almost wholly controlled by American capital. The three American companies operating in Chile accounted for about 95.5 per cent of total production in 1938, the most important factors having been the Chile Copper Company, a subsidiary of the Anaconda Copper Mining Company, which recovered 163,213 short tons; the Braden Copper Company, a subsidiary of Kennecott Copper Corporation, with 132,034 short tons; and the Andes Copper Mining Company (Anaconda) with 60,880 tons.[56] The Chile Copper Company has a plant capacity of about 225,000 short tons of refined copper a year, and ore reserves are the largest in the world, while the estimated copper content of all three companies' reserves is about 37 per cent of the world total.[57] While the grade of copper ore reserves in Chile is somewhat below the world average of approximately 2.27 per cent, the Anaconda and Kennecott properties are efficient and relatively low-cost producers. Thus, it has been estimated that the 1938 production cost of the Chile Copper Company was 6.14 cents per pound, that of the Braden Copper Company about 6.5 cents per pound, and of the Andes Copper Mining Company 7.88 cents per pound, as compared with a world average of between 8 and 9 cents.[58] The foreign companies operating in Chile appear to have been relatively free from serious labor difficulties and onerous government restrictions, although profits have been cut by a sharp increase in taxes which now absorb 33 per cent of net income.[59] Taxes on profits, however, are not apt to restrict operations and, under suitable price and demand conditions, it is probable that the output of the American companies could be increased to a point even beyond the

54. E. Murray Harvey, *Report on Economic and Commercial Conditions in Brazil* (London, H.M. Stationery Office, 1939), p. 107.

55. Cf. Bradley, "Fuel and Power in Latin America," cited, pp. 62, 99; Bain and Read, *Ores and Industry in South America,* cited, pp. 55, 176-82. According to one estimate—official figures have not been published—Colombian coal production was 445,000 tons in 1937, but this appears definitely too high. Antonio Garcia, "An Outline of Colombian Economy," *Commercial Pan America,* January 1939, p. 13. The U.S. Bureau of Mines estimated Colombian coal production at 35,000 tons annually in 1926-1928.

56. *Year Book of the American Bureau of Metal Statistics,* 1935 and 1938, p. 17. In 1937 25,548,555 tons of Chilean ore with an average copper content of 1.86 per cent were extracted, of which Chilean companies accounted for 479,989 tons with a content of 3 per cent. *Mineral Trade Notes,* cited, December 20, 1938.

57. Ore reserves of the Chile Copper Company were estimated in 1935 at 1,035,000,000 short tons, with an average copper content of 2.15 per cent. On December 31, 1934 estimated reserves of the Andes Copper Mining Company consisted of 27,675,000 short tons of oxide ore (1.65 per cent copper) and 97,390,000 tons of sulphide ore (1.42 per cent copper). Ore reserves of the Braden Copper Company were estimated at 226,000,000 short tons with an average copper content of 2.18 per cent on December 31, 1931. The estimated copper content of these reserves is approximately 29,000,000 short tons, against a world total of 78,625,800 tons. Cf. Standard Statistics Company, Inc., *Standard Corporation Records,* Individual Reports Section, Anaconda Copper Mining Co., May 9, 1939, and Kennecott Copper Corp., May 5, 1939; also, *Year Book of the American Bureau of Metal Statistics, 1938,* cited, p. 19.

58. Data from S. D. Strauss, Metals Economist, Standard Statistics Co., Inc.

59. In addition to the basic income tax of 18 per cent, the returns from which are assigned to service on the external public debt, this includes emergency taxes of 15 per cent to finance the earthquake reconstruction and economic rehabilitation program.

present maximum capacity of about 500,000 short tons of refined copper a year.

Although Mexico still ranks as the second largest copper producer in Latin America, it accounted for only 9.3 per cent of total output in 1938, in contrast with 16.7 per cent in 1929. The most important producer is the Greene Cananea Copper Company, owned by Anaconda Copper Mining Company, which contributed about a third of the output in 1938 and over 42 per cent in 1937. This company has a plant capacity of about 50,000 short tons a year, as compared with production of 15,629 tons in 1938. It was estimated in 1935 that developed reserves were sufficient to permit production at the rate of about 30,000 tons annually for eight years.[60] Although overlapping operations prevent a precise analysis, it is believed that American capital controls about 60 per cent of Mexican copper production, British 20 per cent, and French and Mexican the remainder. The chief problem faced by producers is the mounting burden of taxation and labor costs which, despite sizeable reserves, may continue to operate against material expansion in production.[61]

The Cerro de Pasco Copper Corporation accounts for all but a microscopic proportion of Peruvian copper output. Although no estimate has been made of reserves, this company holds a large acreage of ore with high copper content, and has an annual capacity of about 50,000 short tons of refined metal.[62] Cuban copper ore of high grade is mined by the Minas de Matahambre, S.A., controlled by the American Metal Company, Ltd., and is shipped to the United States duty-free for refining. Production potentialities appear limited, since reserves were estimated at only 31,500 short tons (copper content) in 1938.[63] Bolivia, the only other Latin American producer, is not an important factor in world copper output, and possibilities are limited by high production costs.[64]

Cotton. The sharp rise in Latin American cotton production during the past few years warrants the inclusion of this commodity in the list of actual and potential sources of wealth. During 1925-1929, Latin America produced an annual average of 258,400 metric tons of cotton, or less than 4.5 per cent of the world total.[65] In 1937 production amounted to 727,000 tons, equivalent to 8.8 per cent of the total world output.[66] Since over 42 per cent of the output in the latter year was exported, and this bore a ratio of 9.5 per cent to total world trade in cotton, it is apparent that Latin America has become an important source of supply for this commodity. The most spectacular development has occurred in Brazil, whose cotton exports were almost ten times as great in 1937 as in the 1927-1931 period.[67] Brazilian cotton, moreover, has materially reduced the country's heavy dependence on coffee exports.[68] Peru ranks second in Latin American cotton exports, and Argentina and Mexico follow.

Argentina and Brazil appear to possess the greatest possibilities for expansion of cotton production, since both countries have an abundance of available land suitable for this crop, and the former, at least, has no serious labor shortage. In the case of Brazil, low coffee prices have stimulated cotton production and permitted a partial transfer of labor. Thus, to some extent, the importance of future cotton production will depend on conditions in the coffee and other commodity markets, since the labor supply is not sufficient for maximum production of both. So far as Mexico and Peru are concerned, land suitable for cotton production is much more limited and, barring a sustained price advantage over other agricultural commodities, no pronounced gain in the exportable surplus of cotton is indicated. The expanding domestic demand for cotton must also be taken into consideration, notably in the case of Argentina and Mexico.[69]

Iron Ore. Latin America contains some of the richest and largest iron ore deposits in the world, and development possibilities have received an increasing amount of attention over the past few years. As previously pointed out, lack of coking coal in juxtaposition to iron ore reserves and a large internal market will probably prevent the development of an important domestic iron and steel industry in the near future. With improvement in extraction and transportation facilities, however, a greater proportion of Latin American reserves will undoubtedly become available to industrial nations.

Chile is at present the most important producer of iron ore in Latin America, and its output is

60. *Standard Corporation Records,* Anaconda Copper Mining Company, cited.

61. The 12 per cent tax on exports imposed in August 1938 is particularly burdensome. Cf. *Mineral Trade Notes,* cited, January 20, 1939.

62. *Standard Corporation Records,* Individual Reports Section, Cerro de Pasco Copper Corp., June 20, 1938.

63. *Year Book of the American Bureau of Metal Statistics, 1938,* cited, p. 19.

64. Cf. Bain and Read, *Ores and Industry in South America,* cited, p. 312.

65. A metric ton is equivalent to approximately 4.61 bales. Production data from *Statistical Yearbook, 1937-1938,* cited.

66. *Ibid.*

67. *International Year Book of Agricultural Statistics, 1938,* cited. Brazil exported 236,180 tons of cotton in 1937, against an average of 24,370 tons in 1927-1931.

68. Cf. Table II.

69. Cf. H. Gerald Smith, "Cotton Trends in Latin America," *Commercial Pan America,* January 1937.

apparently about half the total for this area. Production of Chilean ore, which originates almost wholly from mines owned and operated by the Bethlehem Steel Corporation, amounted to 1,489,637 metric tons in 1937 and 1,347,831 tons in 1936.[70] In 1913, when the American company purchased its Chilean properties from French interests, it was estimated that the deposit contained over 100,000,000 tons of good quality ore.[71] Chilean iron ore deposits, however, are dwarfed by Brazilian reserves, believed to be the largest in the world and variously estimated at from 1,764,000,000 tons to 8,000,000,000 tons.[72] There are no complete statistics on Brazilian production of iron ore, but exports of 198,309 tons were reported for 1937, almost half of which went to the United Kingdom and over a fifth to Canada.[73] During the same year, domestic pig iron production amounted to 98,101 tons,[74] which would imply the production of roughly twice that amount of iron ore for domestic consumption. On this basis, total iron ore production of somewhat less than 400,000 tons is indicated for 1937.[75] The greater part of Brazilian iron ore is produced by local capital, but American, British and other foreign interests hold substantial deposits. Volume production has been delayed by lack of adequate transportation facilities, high freight rates and relative inaccessibility, but future potentialities are enormous.[76]

Cuba contains sizeable iron ore deposits, about 95 per cent of which is said to be controlled by American steel companies, and the annual production is shipped almost exclusively to the United States.[77] Total shipments in 1937 amounted to 496,258 metric tons, as compared with 456,827 tons in 1936.[78] In the same years, Mexico reported pig iron production of 89,717 metric tons and 78,876 tons respectively, indicating ore output of about twice that amount.[79] In addition to the four countries mentioned, large iron ore deposits have been discovered in both Colombia and Venezuela, but exploitation thus far has been limited. The Bethlehem Steel Corporation has acquired properties in the latter country with reserves estimated at 35,000,000 tons in 1929, and the ore is not only high in quality but easily mined and transported.[80] Increased interest in Colombian iron possibilities is indicated by the recent formation of a company to exploit deposits claimed to contain 300,000,000 tons of ore.[81] Transportation difficulties, which are even greater than in Brazil, however, would appear to limit Colombian potentialities.

Lead. During 1938 Latin America accounted for over a fifth of total world mine production of lead, and the output of the principal producer—Mexico—was exceeded only by the United States. From 60 to 70 per cent of Mexican mine production, which was over three-quarters of the Latin American total in 1938, is controlled by American capital, and virtually the entire output is treated in American-owned refineries.[82] Despite American control, however, comparatively little Mexican lead is imported for consumption by the United States, since domestic production is sufficient to meet requirements. In 1937 the United Kingdom took over 23 per cent of Mexican lead exports, followed by Germany with 9 per cent, while France, Belgium, The Netherlands and Denmark were also important consumers.[83] In the absence of outside influences in the form of stricter government regulation, high taxes and greater concessions to labor, Mexican production of lead may be expected to continue its long-term upward trend, since the industry is efficient and there are ample reserves of

70. *Minerals Yearbook, 1938,* cited.

71. Bain and Reed, *Ores and Industry in South America,* cited, p. 249. Chilean iron ore is shipped to the Sparrows Point, Maryland, plant of the Bethlehem Steel Corporation.

72. Harvey, *Report on Economic and Commercial Conditions in Brazil,* cited, p. 106; Bain and Reed, *Ores and Industry in South America,* cited, p. 146.

73. Roush, *The Mineral Industry during 1937,* cited, p. 344. In 1938, exports were 353,442 tons, of which 44 per cent went to Holland, 25 per cent to Poland, and only a minor quantity to Great Britain and Canada. *Mineral Trade Notes,* cited, April 20, 1939.

74. *Foreign Commerce Yearbook, 1938,* cited, p. 217.

75. The U.S. Bureau of Mines reported Brazilian iron ore production of 30,000 tons annually from 1933 through 1937. *Minerals Yearbook, 1938,* cited, p. 511. This figure is obviously too low in the light of exports alone, although the pig iron figure indicated above may be exaggerated.

76. Lack of transportation equipment is the most important obstacle in the way of Brazilian iron ore development. In 1937 an official of the Central Railway of Brazil stated that requests for transportation of 6,000,000 tons of ore (iron and manganese) had been made, but only 400,000 tons could be handled. Harvey, *Report on Economic and Commercial Conditions in Brazil,* cited, p. 107. The Brazilian "Five Year Plan," however, contains provisions for the development of the iron and steel industry, and the commercial agreement between the United States and Brazil, signed on January 20, 1939, may facilitate purchase of needed railroad equipment. Cf. *New York Times,* January 21, 1939, and *Wall Street Journal,* March 10, 1939.

77. L. Barnett and W. H. Bunbury, *Report on Economic and Commercial Conditions in Cuba* (London, H.M. Stationery Office, 1937), p. 16. The Bethlehem Steel Corporation is the chief operator, and controls several undeveloped properties. *Standard Corporation Records,* Individual Reports Section, Bethlehem Steel Corp., April 18, 1939.

78. *Minerals Yearbook, 1938,* cited, p. 511.

79. *Revista de Estadística,* July 1938, p. 15.

80. Bain and Reed, *Ores and Industry in South America,* cited, pp. 79-80.

81. *Mineral Trade Notes,* cited, September 20, 1938.

82. Operated by subsidiaries of American Smelting and Refining Company and American Metal Company, Ltd. For an account of the operations of these companies in Mexico and other parts of Latin America, cf. *Standard Corporation Records,* cited, Vol. A-B, or Individual Reports Section, cited.

83. *Revista de Estadística,* July 1938.

high-grade ore. Present strained relations between foreign operators and the Mexican government and labor, however, inject a considerable degree of uncertainty into the near-term outlook.[84]

LATIN AMERICAN LEAD PRODUCTION*
(*Metric tons*)

Country	*1929*	*1933*	*1938*
Mexico	248,783	118,693	282,369
Argentina	9,020	4,296	21,200
Bolivia	.....†	7,845	13,225
Chile	.....†	32	200
Peru	19,591	1,949	52,900
Other S.A.	2,268	.....	.....
Total	279,662	132,815	369,894
Per cent of world	16.0	11.5	20.9**

**Year Book of the American Bureau of Metal Statistics,* 1935 and 1938, cited. Data for 1929 are on a smelter basis and hence not directly comparable with the mine basis reported for other years.

†Included in "Other South America."

**Estimated.

Lead production in the rest of Latin America has been about a third of the Mexican output in the past two years, Peru being at present the only other producer of importance. The Cerro de Pasco Copper Company produces about half the Peruvian output and has a refining capacity of about 40,000 short tons a year. The lead, as well as zinc, deposits of this company are among the most important in the world.[85] Argentina's lead production has increased rapidly over the past few years, and virtually the entire output is smelted by the National Lead Company's Argentine subsidiary which has a refining capacity of 18,000 metric tons yearly.[86] The output of Bolivian lead has also expanded recently. A flotation plant with an annual capacity of 20,000 metric tons of lead concentrates was recently erected to treat substantial deposits of high-grade ore, but transportation difficulties still remain an outstanding problem.

Manganese. For the strategic position of the United States, there is perhaps no Latin American raw material of greater potential significance than manganese, an assured supply of which is essential both in war and in the peace-time manufacture of steel.[87] The only important producers in the Western Hemisphere are Brazil and Cuba, which in 1937 mined 253,661 and 131,299 metric tons, respectively, or collectively approximately 6 per cent of estimated world production of 6,500,000 metric tons. In the same year, these two countries supplied about 31 per cent of the import requirements of the United States.[88] This combined output is obviously not sufficient for United States needs, although it is probable that Cuba could double its output if necessary.[89]

It has been estimated that there are some 177 occurrences of manganese in Brazil, of which 27 are of economic significance and 22 are being exploited at the present time.[90] On the basis of a tentative survey, the reserves of explored deposits, almost entirely in Minas Geraes, are placed at 9,000,000 tons, while an additional 90,000,000 tons are believed to exist in the State of Matto Grosso, where the largest single manganese property is owned by the Brazilian government.[91] At present, a Brazilian-owned company, A. Thun & Cia., Ltda., is the largest producer. During 1938 this company exported, largely to Europe, 73,649 tons, against 38,200 tons by the Cia. Meridional de Mineração, which is owned by the United States Steel Corporation. In 1937, however, the Cia. Meridional shipped 122,572 tons, or approximately half the Brazilian total, while A. Thun exported 81,846 tons.[92] As in the case of iron ore, exploitation of Brazilian manganese has been seriously hampered by the lack of rolling stock and the insufficient trackage of the Central do Brasil Railway, which carries most of the minerals in Minas Geraes.[93] There is, moreover, some uncertainty with respect to the labor supply, while high freight and taxes add substantially to the cost of the Brazilian product.[94] If the transportation situation can be corrected, however — and

84. Cf. American Smelting and Refining Company, *Annual Report, 1938.* The president of this company reported that earnings in Mexico had been decreased sharply by increases in direct and indirect labor costs, taxation, and production costs as a result of interference by the *Syndicato* (labor organization) with the management in operations. Consequently, "the company, for the time being at least, has turned its attention elsewhere."

85. *Year Book of the American Bureau of Metal Statistics, 1938,* cited; cf. also *Standard Corporation Records,* cited.

86. *Ibid.*

87. Cf. Emeny, *The Strategy of Raw Materials,* cited, pp. 42-54. For a brief discussion of the strategic position of the United States with respect to manganese, cf. Army and Navy Munitions Board, *Commodities Considered Problematical* (Revised, March 29, 1939), pp. 10-11.

88. All 1937 trade and production statistics from *Commodities Considered Problematical,* cited, pp. 10-11.

89. *Hearings before the Committee on Military Affairs,* cited, pp. 134, 221.

90. U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, *Foreign Metals and Minerals,* Circular No. 18, October 12, 1938, p. 2.

91. *Ibid.,* p. 6.

92. Export data from *Mineral Trade Notes,* cited, May 20, 1938, and April 20, 1939. Manganese produced by the Cia. Meridional is shipped direct to the parent company, the United States Steel Corporation, and hence does not enter into normal commercial channels. It is estimated that this property contains reserves sufficient to supply one-third of the United States Steel Corporation's requirements for at least ten years. *Standard Corporation Records,* Volume T-Z, p. 6856, May 26, 1939.

93. *Foreign Metals and Minerals,* Circular No. 18, cited, p. 7.

94. *Ibid.,* pp. 6-7.

there is evidence that steps in this direction are being taken by the Brazilian government—there is little reason why production could not be expanded materially. Meanwhile, there appear to be no political or financial obstacles to prevent the United States from relying on this source of supply in the event of an emergency.

The principal deposits of Cuban manganese are controlled by the Cuban-American Manganese Corporation which, in turn, is a subsidiary of the Freeport Sulphur Company.[95] The company has a normal production rate of about 100,000 tons of high-grade material (51 per cent metallic manganese) yearly, plus about 20,000 tons of 40-45 per cent material,[96] and reserves in sight are sufficient for at least ten years' operations. Almost the entire production is shipped to the United States, where it enters duty-free, thereby offsetting to a large degree a comparatively low metal content and high extraction costs.[97] Owing to geographical factors, the Cuban reserves are of great strategic significance to the United States.[98]

Mercury. The only important Latin American producer of mercury at present is Mexico, which mined 170.2 tons in 1937, while Bolivia is credited with the exportation of 0.6 tons in the same year. In 1935 these two countries accounted for about 6.7 per cent of total world production.[99]

Nickel. For all practical purposes nickel is a Canadian monopoly, since that country has contributed between 82 and 87 per cent of the world supply over the past few years, but at least one Latin American country—Brazil—contains deposits of potential importance. Brazilian output thus far has been insignificant, amounting to only 104 tons (metal content of ore) in 1937, and 478 tons in 1936.[100] Nickel is mined in the state of Minas Geraes by a Brazilian-owned company, and in Goyaz by a company in which German interests are said to predominate, and shipments have been largely to Germany.[101] Estimates of Brazilian reserves range from 4 to 10 million tons of ore containing 1 to 4 per cent nickel.[102]

Platinum. Latin American platinum production is concentrated in Colombia, which exported 29,460 troy ounces in 1938, as compared with a peak of 54,946 ounces in 1934.[103] About 60 per cent of Colombian platinum is produced by the American-owned South American Gold and Platinum Company, and exports are largely taken by the United States.[104]

Petroleum. In recent years, Latin America has accounted for about 15 per cent of the world output of crude petroleum, and in 1938 Venezuelan production alone was 9.5 per cent of the world total. The actual importance of Latin America in the world petroleum trade, however, is much greater than these figures would indicate, since the bulk of output is exported. In 1937, for example, total Latin American exports of all petroleum products were estimated at 249,494,000 barrels, or approximately 82 per cent of output.[105] By contrast, United States production in 1937 was 1,277,653,000 barrels, which was 63 per cent of the world total and four times the total Latin American output, but net exports (total exports less imports) were only 187,819,000 barrels.[106] Latin American consumption of petroleum in 1937 may be estimated at roughly 110,000,000 barrels, while imports, whether from other Latin American countries or elsewhere, apparently were in the 50-55 million barrel range.[107]

Of the countries listed in the following table, Argentina and Bolivia, while producers, are both net importers. Venezuela, the most important producer, exported 175,727,000 barrels, or about 95 per cent of total output, in 1937, of which 81 per cent went to the Netherlands West Indies where Latin America's principal refineries are located.[108]

95. Cf. Emeny, *The Strategy of Raw Materials,* cited, pp. 54-55.

96. *Hearings before the Committee on Military Affairs,* cited, p. 144.

97. Cf. *Report on Economic and Commercial Conditions in Cuba,* cited, p. 16.

98. Mexico, Argentina and Chile, in addition to Brazil and Cuba, produce minor quantities of manganese, but development possibilities are limited.

99. *Minerals Yearbook, 1938,* cited, p. 605. Mercury deposits have also been reported in Chile, Colombia, Ecuador and Surinam, but are of no present commercial importance. Cf. Bain and Reed, *Ores and Industry in South America,* cited.

100. *Minerals Yearbook, 1938,* cited, p. 554. A Brazilian mine in 1936 contracted to supply the German firms of Krupp and Stern with 60,000 tons of 2-2.5 per cent nickel ore. *Ibid.,* p. 555.

101. Harvey, *Report on Economic and Commercial Conditions in Brazil,* cited, p. 108.

102. *Minerals Yearbook, 1938,* cited, p. 555. In 1936 a Cuban firm claimed to control a large deposit of ore containing 1.6 per cent nickel. *Foreign Metals and Minerals,* cited, Circular No. 5, June 15, 1936, p. 13.

103. *Revista del Banco de la República* (Bogotá), April 1939, p. 146. Until recently, Colombia was the second largest world producer of platinum, with an output equal to about 40-50 per cent of the Russian, but since 1934 Canada has risen to first place, and Colombia now ranks third.

104. Cf. *Minerals Yearbook, 1938,* cited, pp. 666-67.

105. Data compiled from U.S. Department of the Interior, Bureau of Mines, *International Petroleum Trade,* various, 1938 and 1939.

106. *Minerals Yearbook, 1938,* cited.

107. For consumption data on the principal Latin American countries, cf. Transactions of the American Institute of Mining and Metallurgical Engineers, *Petroleum Development and Technology 1938* (New York, 1938), p. 306. Argentine consumption in 1937 was 25,300,000 barrels, against recorded production of 16,355,000 barrels, while consumption of the principal non-producers was: Brazil, 8,100,000 barrels; Cuba, 4,750,000 barrels; Chile, 3,510,000 barrels; and Uruguay, 2,730,000 barrels.

108. Trade statistics from *International Petroleum Trade,* April 25, 1939.

During the same year, Mexico exported an estimated 24,320,000 barrels (52 per cent of production), of which less than one-third was crude petroleum; Colombia, 17,743,000 barrels (87 per cent of production), almost all in crude form; Peru, 15,810,000 barrels (91 per cent of production), of which three-quarters were crude; Trinidad, 14,127,000 barrels (91 per cent of production), almost all refined products; and Ecuador, 1,767,000 barrels (82 per cent of production).[109] By far the larger part of Latin American petroleum production is shipped first to the Netherlands West Indies for refining before entering into world trade channels.[110] Owing to this factor, together with shipments to various other points for redistribution and intra-Latin American trade, it is virtually impossible to trace Latin American petroleum to its ultimate consuming market. Of total 1937 exports, however, it is probable that about 25 per cent went to the United States, 20 per cent to the United Kingdom, and around 5 per cent each to Canada, France, Germany and The Netherlands. Roughly half of the remaining 35 per cent apparently was exported to other Latin American countries, either directly from the producing state or from the refineries in the Netherlands West Indies.

LATIN AMERICAN PRODUCTION OF CRUDE PETROLEUM*

(In thousands of barrels)

Country	*1929*	*1933*	*1938*
Mexico	44,688	34,001	34,794
Trinidad	8,716	9,561	17,736
Argentina	9,391	13,691	16,937
Bolivia	.....†	112	107
Colombia	20,385	13,158	22,450
Ecuador	1,381	1,620	2,246
Peru	13,422	13,257	15,839
Venezuela	137,472	117,720	187,369
Total	235,455	203,120	297,478
Per cent of world	15.8	14.1	15.0

*Compiled from U.S. Department of the Interior, Bureau of Mines, *Mineral Resources of the United States*, Part II, 1930 (1929 data); *Minerals Yearbook, 1938*, cited (1933 data); and *International Petroleum Trade*, various issues (1938 data).
†Less than a thousand barrels.

Latin American petroleum production is dominated by two major corporations—the Standard Oil Company of New Jersey and the Royal Dutch Company—which in 1937 accounted for 40 and 34 per cent, respectively, of total output.[111] In the same year, both companies derived about one-third of their total output from Venezuela, where Standard Oil subsidiaries accounted for about 44 per cent of crude production and Royal Dutch about 37 per cent. The latter also produced 62 per cent of Mexican oil in 1937, about 21 per cent of Argentine output, and 11 per cent of Trinidad, while Standard Oil of New Jersey controlled all Colombian output and over 80 per cent of Peruvian.[112] As indicated in the accompanying tabulation, Venezuelan oil production has increased rapidly over the past few years, and this country probably will continue to be the chief producer in Latin America over the coming years. For the immediate future, however, Colombia is destined to show the largest percentage gain in output, since the Barco concession owned by the Colombian Petroleum Company, which is controlled jointly by the Socony-Vacuum Oil Company and the Texas Corporation, has an initial productive capacity of about 10,000,000 barrels annually.[113] Construction of a pipe line to tidewater is expected to be completed by the end of 1939, and the new output, which is equal to almost 50 per cent of present production, will then enter into world commercial channels.[114]

Rubber. Since the rise of plantation production on a large scale in the Far East, Latin America has ceased to be an important factor in the world rubber trade, but there is evidence that some of the

109. *Ibid.*, various issues.

110. The refinery industry in the Netherland West Indies was established because of a central geographic location and accessibility to the principal producing areas by water transportation.

111. Data compiled from Royal Dutch Company for the Working of Petroleum Wells in Netherlands Indies, *Annual Report for 1937;* and *Standard Corporation Records*, descriptions of Standard Oil Company of New Jersey, Imperial Oil, Limited, International Petroleum Company, Limited, and Creole Petroleum Corporation.

112. The question of the control of Latin American petroleum has, of course, been changed by Mexican expropriation of foreign-owned oil properties and, to a minor degree, by similar Bolivian action. Mexico, however, while the second largest producer in Latin America, accounted for only 11.7 per cent of output in 1938, and Bolivia is still a negligible, although perhaps potentially important, factor. For an account of Mexican expropriation, cf. Charles A. Thomson, "The Mexican Oil Dispute," *Foreign Policy Reports*, August 15, 1938. Little progress toward settlement has been made since the publication of this report, but the boycott imposed by the foreign oil companies formerly operating in Mexico has caused both a drop in output and a shift in Mexican exports from the United States and the United Kingdom to the totalitarian states.

For an outline of the Bolivian dispute with the Standard Oil Company, cf. Rene Gutierrez Guerra, "Bolivia and the Standard Oil Company," *Bolivia* (Consulate General of Bolivia, New York), March-April 1939 (condensed from a brochure published by Imprenta Renacimiento, La Paz, 1938). Cf. also John I. B. McCulloch, "Bolivian Politics and Oil," *Events*, June 1939. Chile, too, is planning an oil monopoly, but this applies only to distribution facilities, since the country is not a producer. Cf. *Christian Science Monitor*, June 19, 1939.

113. Data from Dr. Norman D. Fitz Gerald, Petroleum Economist, Chase National Bank of New York.

114. For recent developments in connection with the Barco concession, cf. *Standard Corporation Records*, Individual Reports Section, Socony-Vacuum Oil Company, July 29, 1938 and May 12, 1939.

lost ground is being slowly regained. In 1937 Latin America accounted for 1.7 per cent of the world rubber production, as compared with 1.0 per cent in 1932 and an average of 4.5 per cent in 1925-1929, when high prices stimulated Brazilian wild rubber production.[115] Rubber production is concentrated almost entirely in the Brazilian states of Pará and Amazonas, although the rubber tree is found in many other sections of the Latin American lowland tropics. The Ford Motor Company has properties said to total 12,792 square kilometers in Pará on which 3,000,000 rubber trees have been planted, and about 5,000,000 additional trees are ready for transplanting.[116] By 1944 these trees should be producing a substantial amount of rubber and, if the experiment proves successful, further attempts will probably follow. The chief obstacles to plantation rubber development in Brazil are lack of efficient labor and the difficulty of securing capital for a highly speculative and long-term venture. The Brazilian government is actively interested in fostering the development of the domestic rubber industry, which long held first place in world production, and part of the credits contemplated in the financial agreement concluded with the United States in March 1939 may be used for this purpose.[117]

Total Latin American rubber production in 1937 amounted to 19,000 metric tons, as compared with the world total of 1,154,000 tons.[118] The United States absorbed about 43 per cent of exports and Germany some 37 per cent, although in both cases imports from Latin America were a negligible proportion of aggregate requirements.[119] Future production possibilities are closely linked with the degree of success which attends plantation development, since only under exceptional price conditions over an extended period is it believed that wild rubber production in Brazil could be expanded to even as much as 25,000 tons yearly.[120]

Tin. So far as present production and immediate potentialities are concerned, the Latin American tin mining industry is confined almost wholly to Bolivia, which has long been one of the leading world producers of this metal. The relative importance of Bolivia has declined considerably since the pre-depression years, however, with 1937 output accounting for less than 12 per cent of the world total, in contrast with an average of almost 23 per cent in the 1925-1929 period.[121] Although some recovery was shown in 1938 when the ratio was raised to approximately 17 per cent,[122] Bolivia has at times had difficulty in filling the quota assigned to it by the International Tin Committee, of which it is a member. In 1937, for example, its export quota was 49,397 tons, but actual Bolivian exports amounted to only 25,024 tons. In the following year, when the quota was reduced to 21,917 tons, exports advanced to 25,371 tons out of a world total of 148,400 tons.[123]

Bolivia's tin resources are among the richest and most extensive in the world, and some authorities believe that the tin-bearing lodes of this country may "become the backbone of the world's future tin production."[124] The Bolivian lode mining industry, however, is far less efficient than the dredging operations of the Far East, and production costs are consequently high.[125] Aside from the fact that extraction costs are higher in vein mining than in alluvial deposits, the Bolivian industry faces high transportation costs to the seacoast, a heavy and complicated taxation system, and the burden of exchange control.[126] Moreover, the industry has suffered from an acute shortage of suitable labor in recent years, owing largely to the depletion of man power caused by the Chaco war with Paraguay. If these problems could be solved, it is believed that Bolivia could produce about 60,000 tons of tin annually, as compared with United States consumption of 50,724 tons in 1938 and 86,663 tons in 1937.[127]

No recent analysis has been made of the division of foreign and domestic capital in the Bolivian tin industry, but it is probable that local and Chilean

115. *World Production and Prices, 1937-1938,* cited, p. 119. Rubber accounted for only 0.1 per cent of the value of aggregate Latin American primary production in 1937. *Ibid.,* p. 119.

116. *Brazilian Business,* April 1938, p. 187. Production of Pará was placed at about 4,800 tons yearly and that of Amazonas at about 6,000 tons.

117. Department of State, *Press Releases,* March 9, 1939. "The government of Brazil is especially desirous of stimulating the systematic large scale production of agricultural products native to Brazil . . . which will . . . find a market in the United States."

118. *Statistical Yearbook, 1937-1938,* cited.

119. Cf. *International Trade in Certain Raw Materials and Foodstuffs, 1937,* cited.

120. E. G. Holt, Chief, Leather and Rubber Division, Bureau of Foreign and Domestic Commerce. Prior to the World War, Brazil produced as much as 40,000 tons of wild rubber annually.

121. *Minerals Yearbook, 1938,* cited, p. 620.

122. International Tin Research and Development Council, *Statistical Yearbook, 1939* (The Hague, 1939), p. 12.

123. *Ibid.,* p. 12.

124. Charles White Merrill, "World Reserves and Resources of Tin," Bureau of Mines, Information Circular No. 6249, March 1930, p. 5.

125. Cf. *The Manchester Guardian Commercial,* February 10, 1939. The cost of Bolivian tin delivered in Britain has been estimated at £185 per ton. *Mineral Trade Notes,* cited, January 1938. In contrast, a well-managed and reasonably capitalized Malayan tin mine should be able to lay down tin in London for £129 18s, while the Chairman of the Board of the Straits Trading Company placed the cost of production and delivery to London at £127 per ton. *Ibid.,* November 20 and December 20, 1937.

126. Cf. *New York Times,* June 19 and July 10, 1939.

127. Roush, *The Mineral Industry during 1937,* cited, p. 593. United States consumption statistics from International Tin Research and Development Council, *Statistical Year Book, 1939,* p. 65.

capital accounts for over 50 per cent of production, the chief foreign interests being American and British.[128] Bolivian tin ore is sent almost exclusively to England for refining, although steps have been taken recently to establish a domestic smelting industry.[129] Owing to higher costs, the United States has no tin smelters, but during the World War an English company established a plant in this country which smelted a considerable portion of the Bolivian output for the American market.[130]

A limited amount of tin is mined and smelted in Argentina by a domestically owned company which is working alluvial deposits in the northern part of the country.[131] Ore output in 1938 amounted to 3,272 tons, as compared with 2,606 tons in 1937, while smelter output was 1,118 and 1,133 tons, respectively.[132] Mexico and Peru also produce tin in small quantities, but development possibilities appear limited.

Tungsten. The importance of tungsten as a ferro-alloy and in the manufacture of incandescent lamps is much greater than its small production and consumption would indicate.[133] Consequently, while it is not an important source of wealth to Latin America at present, the fact that this area contains substantial reserves is of considerable potential significance, particularly in relation to the strategic position of the United States in time of war. In 1936, the last year for which complete statistics are available, world production of tungsten concentrates (60 per cent WO_3) amounted to 24,746 metric tons, of which Latin America accounted for 2,592 tons, or about 10.5 per cent.[134] The principal producing country is Bolivia, which contributed two-thirds of the 1936 output (1,741 tons), followed by Argentina with about 27 per cent (702 tons), while Peru and Mexico accounted for the remainder. The greatest production potentialities are in Bolivia, which is said to have a potential capacity of 10,000 tons annually, while even under present conditions approximately 4,000 tons could be produced.[135]

The United States controls most of the Bolivian tungsten production,[136] but only a minor amount is imported from this source.[137] In Argentina the principal tungsten mines, which were mainly under German control prior to the war, are now in American hands. In recent years Germany has been the principal export market, however, with comparatively little of the metal being shipped to the United States.[138] Aside from established sources of supply in the countries mentioned, sizeable deposits have been reported in Cuba, and it is understood that a company with a capital of 1,000,000 pesos is being formed by the Pan-American Steel and Alloy Company of Montreal to produce wolframite concentrates and ferro-tungsten of high grade.[139]

Vanadium. As in the case of tungsten, the importance of vanadium lies in its use in the manufacture of special alloy steels and iron. Peru has the only known deposits of commercial importance in Latin America, and production in 1937 was about 583 tons out of a total world output of approximately 1,893 tons. The entire output is produced from a mine owned by the Vanadium Corporation of America.[140]

Zinc. The estimated metal content of zinc ore produced in Latin America during 1938 amounted to 173,000 tons, as against 169,200 tons in 1937, which may be compared with world totals of 1,071,600 tons and 1,021,800 tons, respectively. Mexico produced about 82 per cent of the Latin American aggregate during the two years, while Peru ranked second with an output of 12,400 tons in 1938. Production in Argentina, where development of the industry has been particularly rapid during the past few years, was 12,200 tons in 1938, and Bolivia accounted for the remaining 6,800 tons of the Latin American total for the year.[141] American financial interests dominate Latin American zinc production but, owing to large domestic production, a comparatively small amount of the metal is shipped to the United States.[142]

128. For a somewhat outdated analysis of the control of Bolivian tin, cf. Margaret A. Marsh, *The Bankers in Bolivia* (New York, Vanguard Press, 1928), pp. 44-51.

129. Cf. *Foreign Metals and Minerals,* cited, Circular No. 12, April 17, 1937, pp. 4-5. While the goal is the smelting of all tin ore produced in Bolivia, the project appears to be getting under way quite slowly. Cf. *Minerals Yearbook, 1938,* cited, p. 622.

130. For a discussion of this point, cf. Patiño Mines and Enterprises Consolidated, Inc., *Annual Report for the Year 1937.*

131. *Foreign Metals and Minerals,* cited, Circular No. 13, August 31, 1937.

132. International Tin Research and Development Council, *Statistical Year Book, 1939,* cited, p. 31.

133. Cf. *Commodities Considered Problematical,* cited, p. 16.

134. *Minerals Yearbook, 1938,* cited, p. 573.

135. Cf. Emeny, *The Strategy of Raw Materials,* cited, pp. 78-84.

136. Bain and Reed, *Ores and Industry in South America,* cited, p. 345.

137. In 1937 only 8 per cent of Bolivian tungsten exports were consigned to the United States, as compared with 57.7 per cent to Belgium, 12.2 per cent to Britain, and 11.7 per cent to Sweden. *Bolivia,* March-April 1939, p. 24.

138. *Foreign Metals and Minerals,* cited, Circular No. 10, December 9, 1936.

139. *Mineral Trade Notes,* cited, May 20, 1939.

140. Cf. *Minerals Yearbook, 1938,* cited, p. 576.

141. All statistics from *Year Book of the American Bureau of Metal Statistics, 1938,* cited.

142. In the case of Mexico, 36 per cent of 1937 exports went to Germany, 28 per cent to Belgium and only 12 per cent to the United States. *Revista de Estadistica,* July 1938, p. 63.

CONCLUSION

This necessarily brief survey of the commodity and other resources of Latin America brings out several salient features of the area's economic structure. In the first place, it is apparent that Latin America, despite rapid strides in the development of its domestic manufacturing industries over the past few years, still owes its economic importance to its capacity as a primary producer. Attainment of maximum agricultural and mineral production is still a long way off. It is possible, however, that internal economic development, accompanied by continued expansion of domestic industry and a rising standard of living, will reduce the proportion of raw materials and foodstuffs available for export. While this is in most cases a matter for the future, rapid economic recovery in the industrial nations or a major European war could easily produce a temporary shortage in various key materials produced by Latin America.

Control of essential raw materials supplies in non-industrial countries has been closely associated with the rise of the modern industrial state. While Latin America contains only a few colonies or dependencies of the industrial powers, it has been subjected to a high degree of foreign economic penetration. Until the rise of fascism, this penetration was more the work of business corporations than national governments—although the latter did not hesitate to act openly or covertly on behalf of corporate interests. American business concerns, for example, gained control over a large part of Latin America's mineral production at an early date, but the motivating factor was corporate self-interest rather than any deliberate plan to strengthen the strategic position of the United States. World political tension, however, has invested American corporate control of such commodities as Chilean copper, Colombian petroleum, Cuban manganese, Guianian bauxite and Peruvian vanadium with new significance.

Until the appearance of bilateral trade agreements and the spread of war fears, the question of control or availability of Latin American raw materials and foodstuffs was almost purely academic. Even today, despite agreements negotiated by the totalitarian countries, and special trade arrangements on the part of Great Britain and the United States, the majority of Latin American products is readily available to any nation which has foreign exchange. Such canalization of trade as has taken place consists largely of intra-corporate commodity movements rather than national monopolies. Thus, for example, the iron ore produced by the Bethlehem Steel Corporation in Chile, the bauxite produced by American interests in Surinam, or the manganese shipped from the United States Steel Corporation's Brazilian properties do not enter into ordinary commercial channels. Conversely, while Great Britain absorbs all but a small percentage of Argentine meat exports, neither the producing nor the consuming country would object under normal conditions to additional sales elsewhere.

The Latin American economy is not perfectly complementary to that of the United States. As a matter of fact, this country provides only a limited market for many of Latin America's most important products, such as wheat, corn, meat, petroleum and most of the non-ferrous metals. Yet Latin America furnishes so many commodities essential to this country's living standards and to its economic structure as a whole that imports from Latin America are far more essential to the United States than exports to that region. In time of war, moreover, Latin American resources of strategic materials—such as tin, manganese, chromium, bauxite, antimony and tungsten—might be of decisive importance because of the comparative ease of transportation and the virtual invulnerability of Latin America to blockade. For this reason—in addition to the normal preoccupation of any industrial state with expansion of foreign trade—the United States has recently devoted an increasing amount of attention to tightening commercial and political bonds with Latin America. An essential feature of the Washington Administration's Latin American aid program is the development of new and non-competitive products in this area which may find a market in the United States. Cooperation along these lines, together with financial assistance and extension of the trade agreements program, is destined both to check totalitarian penetration of Latin America and bring the wartime self-sufficiency of the Western Hemisphere closer to realization.

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